KENTUCKY'S STEM IMPERATIVE:
COMPETING IN THE GLOBAL ECONOMY

Study Group on Recommendation 6 to the Final Report of the Council on Postsecondary Education STEM Taskforce

"Engage business, industry, and civic leaders to improve STEM education and skills in the Commonwealth and create incentives for Kentucky businesses that employ and invest in STEM educated students."

Subcommittee Members:

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Should this Strategy be adopted by the CPE STEM Taskforce?

YES _7__ NO _1__

Strategy:
Develop vertical teams such as expanded P-16 Councils to facilitate the local collaboration of P-16 educators, businesses, and government and to facilitate collaborative learning such as Advanced Placement and International Baccalaureate programs, the Kentucky Academy for Mathematics and Science, and informal educational opportunities.

Objectives (to achieve the strategy):
- Align academic standards across the curriculum P-16.
- localize efforts to develop interaction with students in adult mentoring, career exploration and classroom speakers.
- Develop public/private partnerships with development goals/objectives
- Expand membership and participation by business leaders in Statewide and Local P-16 Councils

Accountability & Assessment (Responsible Person/Agency):
- Utilize existing networks such as Tech Prep, School to Careers and Project "lead the way.
- CPE and Statewide P-16 Council

Timeline for Completion:
- 2007-08

Funding Source/Estimated Cost:
- Fund local P-16 Councils in the amount of $35,000. per year

Additional Comments:
- The most effective P-16 Councils expanded their selection of stakeholders (including students) and partnered with businesses. This strategy would motivate all P-16 Councils to embrace collaborative learning opportunities.

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _8__ NO _0(1)__

Strategy:
Create opportunities for STEM educators and students to apply classroom knowledge to real-world applications in the workplace.

Objectives (to achieve the strategy):

- Create model programs that identify strong applications of STEM in professional careers.
- Identify best practices to facilitate collaboration between secondary and postsecondary educational systems, and business and industry practitioners and associations to develop and integrate real-world applications into curricula.
- Identify best practices to facilitate the development and integration of assessment items into existing assessment tools, or develop new assessment tools to measure whether or not the required level of knowledge has been successfully attained by the target audience.
- Utilize technological tools (iRespond units which are handheld radio frequency devices that measure individual attainment in real time.) and innovative approaches such as visualization techniques to deliver instruction and measure the attainment of knowledge.
- Require "project oriented" learning for STEM subjects to develop knowledge and skill in application of learning to "making things"

Accountability & Assessment (Responsible Person/Agency):

- Enhance current School to Career program
- As a starting point, I recommend collaboration with Secretary Laura Owens of the Education Cabinet which includes the Department of Education, Department for Workforce Investment and the Council on Postsecondary Education.
- Involve P-16 councils (Statewide and Local)

Timeline for Completion:

- Summer Internship
- 2007-09

Funding Source/Estimated Cost:

- Sponsor Companies
- STEM Labs in middle and high schools (est. $20K/per lab where required)
- Shops and infrastructure, where required (est. $30K/shop)

Additional Comments:

- A STEM teacher summer internship program (with stipends) to enable teachers to work with real-world businesses during summer break
- I would hope this is happening, perhaps ways to recognize some of these at all grade levels

- Teachers need real-world examples to ignite student interest. Real-world problem-solving motivates students and provides them with an additional sense of accomplishment. This strategy complements the last strategy listed regarding the exploration of corporate education partnerships.
- I believe that the delivery of educational instruction through an applied learning model is an effective approach because students probably enjoy the learning experience as compared to the more traditional lecture model. The applied learning model creates more interaction between the instructor and their target audience, and students have more appreciation for the value of the knowledge being delivered.

Should this Strategy be adopted by the CPE STEM Taskforce?

YES __7_ NO _1__

Strategy:
Create opportunities for P-16 students to participate in STEM clubs and competitions such as science fairs, robotics competitions, American Math Competitions, and Math Counts.

Objectives (to achieve the strategy):
- Have sponsor companies work in private/public partnerships

Accountability & Assessment (Responsible Person/Agency):
- Include participation and achievement rate criteria in school and district evaluation (Education Cabinet and CPE)

Timeline for Completion:
- School year (2nd half)

Funding Source/Estimated Cost:
- Sponsor companies

Additional Comments:
- The high performing student will participate in these activities. Efforts should be targeted to raise the bar for the mid performing under achiever.
- This should be a logical extension of existing competitions.
- This is happening some in some places, just need a way to get schools to see this as important.
- Rather than create more opportunities, the Taskforce should increase support of the existing opportunities mentioned as well as Student Technology Leadership Program (STLP) regional and state competitions.

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _7__ NO __1_

Strategy:
Contribute leadership expertise and support for the STEM public awareness campaign.

Objectives (to achieve the strategy):

- Assure parental awareness by making it interesting ("American Idol" of STEM topics)
- Implement a public awareness campaign of the need for technical careers and the high paying job that will result.
- Recruit marketing professionals from public and private sector organizations represented on the STEM Task Force to advise and consult with a marketing firm that would most likely be hired to develop and implement the public awareness campaign.

Accountability & Assessment (Responsible Person/Agency):

- Efforts should target middle and high school teachers as well as the public. Our schools are paying attention to only those who the counselors deem college prep. The perception does not exist that technical careers are a path to high paying jobs and contribution to society as a whole. The opportunity associated with careers tied to STEM disciplines will be more motivational than just learning core content.

Timeline for Completion:

- 2008-09

Funding Source/Estimated Cost:

- $500,000.

Additional Comments:

- Is there a one stop place to help find out more about STEM across state?
- Part of the problem is cultural acceptance of low student performance in STEM areas.
- The aforementioned marketing professionals would bring value to the public awareness campaign both because of their marketing expertise, and the unique perspectives and insights their organizations bring to the table to craft an effective marketing message.

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _7__ NO _2__

Strategy:
Expand and improve STEM workforce development and training programs so they teach the skills needed in today's knowledge economy, especially at the Area Technology Centers.

Objectives (to achieve the strategy):
- Assess STEM needs for workforce development by business sector (ex. AMTEC)
- Engage business practitioners in development and delivery of training programs (ex. Advanced Technology Center of BCTC)
- Assure strong connection of ATC programs to Technical College requirements as pipeline to employment in knowledge economy jobs.

Accountability & Assessment (Responsible Person/Agency):
- KCTCS and CPE

Timeline for Completion:
- 2007 and beyond

Funding Source/Estimated Cost:
- Grants are available through NSF and matching funding from Kentucky should be available up to $2 million over next budget period

Additional Comments:
- Area Technology Centers need to be teaching current and aligned curriculum, but the leadership and big picture of technical training needs to occur at the postsecondary level.
- Career and tech folks should be addressing this
- I believe that the delivery of educational instruction through an applied learning model is an effective approach because students probably enjoy the learning experience as compared to the more traditional lecture model. The applied learning model creates more interaction between the instructor and their target audience, and students have more appreciation for the value of the knowledge being delivered.

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _4__ NO _3__

Strategy:
Provide leadership in developing a statewide strategy for energy sustainability and independence.

Objectives (to achieve the strategy):

- Campaign around getting people knowledgeable and energized – "Why is this important to our future"
- Enhance research partnership between high schools, community colleges and universities

Accountability & Assessment (Responsible Person/Agency):

- University of Kentucky Center for Applied Energy Research

Timeline for Completion:

- 2008-09, implementation date

Funding Source/Estimated Cost:

- Public funds
- Fund study and strategy development up to $200K in next budget period

Additional Comments:

- What does this really mean to the average person?

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _7__ NO __1_

Strategy:
Increase corporate grant and in-kind funding of STEM education and expand the reach of programs statewide.

Objectives (to achieve the strategy):
- Develop local task force as corporate committee of P-16 Councils.

Accountability & Assessment (Responsible Person/Agency):
- P-16 Councils

Timeline for Completion:
- 2009-10

Funding Source/Estimated Cost:
- Could occur with additional funding to hire coordinator of P-16

Additional Comments:
- Rural area need, seems the same as last strategy
- This strategy would be addressed through other listed strategies and should not be identified separately

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _8__ NO _1__

Strategy:
Explore incentive programs for businesses that commit to hiring STEM graduates from Kentucky institutions and invest in Kentucky STEM research and education.

Objectives (to achieve the strategy):

- Establish corporate scholarships and teacher exchange endowments
- Develop a STEM education foundation which would solicit, secure and manage funds from public and private sector sources to provide full funding for tuition, books and a stipend for living expenses for students that meet specific entrance criteria and maintain a higher than average grade point level during their educational experience. I believe that certain public and private sector organizations would be willing to fund the aforementioned expenses in exchange for students agreeing to employment with their organization for a predetermined period of time, place of employment and compensation/benefits package. Students that choose not to accept the employment option would have to agree, prior to entering the program, to a predetermined plan to repay the organization all or part of the related expenses.
- Assure corporate R&D expenditures are directed to Kentucky institutions

Accountability & Assessment (Responsible Person/Agency):

- P-16
- University of Louisville and University of Kentucky (primarily) with Regional Universities in appropriate fields

Timeline for Completion:

- 2009-10

Funding Source/Estimated Cost:

- R&D tax credit for corporate investment in Kentucky institutions/students

Additional Comments:

- Initiative will not occur within education. Must be driven by business willing to sit at the table and participate with time and money.
- East Ky Power just provided an engineer to be trained in the Project Lead the Way program. We hope to be able to support STEM through this program.
- Very important
- The Commonwealth of Kentucky has successfully used a similar approach to recruit candidates for careers in civil engineering within the Transportation Cabinet.
- Businesses hire according to their needs. We have to assume that the workplace will hire well qualified people that are STEM competent.

- Need to “tip the playing field” toward Kentucky institutions by giving companies an incentive to look here first with their R&D funding

Should this Strategy be adopted by the CPE STEM Taskforce?

YES _8__ NO _0__

Strategy:
Explore corporate education partnerships that enable co-teaching of STEM courses, internships for teachers, professional development for teachers by corporate practitioners of STEM, and possible technology assistance and technology donations.

Objectives (to achieve the strategy):
- Develop a systematic approach of team teaching utilizing corporate expertise for hands-on demonstration of STEM theories
- Develop an on line pool of corporate participants
- Develop a schedule of shared resources among school districts to conduct joint presentations.
- Establish a system for credentialing industry practitioners (current and retirees) to teach in K-12

Accountability & Assessment (Responsible Person/Agency):
- Education Cabinet

Timeline for Completion:
- 2008-09 planning
- 2009-10 implementation

Funding Source/Estimated Cost:
- General fund allocation to increased number of STEM teachers and for startup of Project Lead the Way across Kentucky

Additional Comments:
- See above regarding Project Lead The Way.
- Important in rural areas
- This strategy has the potential to affect the most positive change.
- This strategy might be better addressed under another recommendation study group, but it is important.

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